

**Comment (Case 3700) – A statement against the proposed designation of *Diplodocus carnegii* Hatcher, 1901 as the type species of *Diplodocus* Marsh, 1878 (Dinosauria, Sauropoda)**

(see BZN 73(1): 17–24 [Case]; BZN 73(2–4): 127, 128, 132–133, 134–135)

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Tschopp & Mateus (2016) propose to designate *Diplodocus carnegii* as the type species of *Diplodocus*, as they view the current type species *D. longus* as undiagnostic. However, there are problems with this proposal:

1. While the authors view *D. longus* as indeterminate, this opinion is based on a phylogenetic analysis published as Tschopp et al. (2015), which merely found it had no unique characters within those used to construct the data matrix. This led to it forming a polytomy with the *D. carnegii* holotype, the *D. carnegii* paratype, and a clade of specimens forming *D. hallorum*. Yet the particular characters used to construct a matrix do not represent every potential aspect of morphological variability, and indeed depending on the matrix used many diagnostic species would score identically in many analyses. Nor is the undiagnostic status of *D. longus* even consensus, as the previous publication to examine the problem (McIntosh & Carpenter, 1998) concluded *D. longus* was distinct based on having shorter caudals with pleurocoels that extend less far distally in the tail, and being stratigraphically older as well. Tschopp & Mateus (2016) did not engage with these arguments, which even if invalid underlie the point that their proposal is based on a single paper published less than a year earlier.

2. The authors state “retention of *D. longus* as type species would create insecurities and confusion concerning the use of *Diplodocus* as a genus”, but provide no evidence of this. They explicitly state *D. longus* “can be clearly referred to the genus *Diplodocus* as generally perceived”, so that its use as both a type species and specifier for phylogenetic nomenclature is unharmed. Due to the influence of Wilson & Upchurch (2003), who believed *Titanosaurus* to be undiagnostic and stated “co-ordinate suprageneric Linnean taxa must likewise be abandoned”, there is a mistaken assumption among some dinosaur researchers that eponymous suprageneric clades must be based on diagnostic species. Yet the Code says no such thing, and indeed Article 11.7.1.1 only states the eponymous genus “must be a name **then used** as valid in the new family-group taxon” (emphasis mine). As *Diplodocus longus* was seen as valid by Marsh (1884) when he named Diplodocidae, any eponymous coordinate taxa covered by the Code are unaffected. Similarly, Tschopp & Mateus (2016) merely state that as an eponymous genus, *Diplodocus* “should not be typified by an undiagnosable type species” without stating either Code rules or functional consequences that support this. Although phylogenetic nomenclature is not covered by the ICZN and the Phylocode is still in draft stage, it should be noted that as long as *Diplodocus longus* falls within our concept of *Diplodocus*, its undiagnosability within the genus has no effect on suprageneric phylogenetic definitions. If *D. longus* might belong

outside the concept of *Diplodocus* as currently used, there would be a case, but Tschopp & Mateus (2016) agree with every prior author that that is not likely.

3. The claim by Tschopp & Mateus (2016) that a future in which “new studies show that *D. longus* and *D. carnegii* are in fact the same species” is improbable, but that is just what Tschopp et al.’s (2015) results would suggest is possible. Recall *D. longus* forms a polytomy with *D. carnegii* specimens in their analysis, and is not a member of the *D. hallorum* clade. Thus *D. longus* is equally likely to be sister to *D. carnegii* + *D. hallorum*, sister to *D. hallorum*, or sister to or synonymous with *D. carnegii*. As they claim there are no characters outside those viewed as individual variation that differ between *D. longus* and *D. carnegii*, synonymization seems even more plausible.

4. Finally, the Tschopp & Mateus (2016) argue the cases of *Cetiosauriscus*, *Cetiosaurus* and *Stegosaurus* are similar and were accepted by the Commission. However, the first two cases involved type species whose holotypes could not be referred to the contemporary concept of the genus in question. The holotype of ‘*Cetiosauriscus*’ *leedsi* is from a different formation than the resulting type species *C. stewarti*, and was last thought to be a macronarian (Upchurch & Martin, 2003), while *C. stewarti* has never been assigned to that clade. Similarly, Upchurch & Martin (2003) could only assign the syntypes of ‘*Cetiosaurus*’ *medius* to Sauropoda, while the resulting type species *Cetiosaurus oxoniensis* is recognized as a non-neosauropod eusauropod. The case of *Stegosaurus* is similar in that the original type was never agreed by consensus to be undiagnostic, had a previous author argue for diagnosability, and was agreed to belong to the genus in question. In that case too, its author argued “*Stegosaurus armatus* MARSH 1877 is a nomen dubium, and *Stegosaurus* is not available as a genus or as the basis for the Stegosaurinae, Stegosauridae, Stegosauroidae or Stegosauria” without recourse to rule or consequence. The result of that decision, when the original holotype has never even been described in detail or in a modern context, should be avoided in the future.

5. Notably, there is precedent in vertebrate paleontology for an apparently indeterminate type species being retained in the company of diagnostic species. Lihoreau et al. (2014) believe the holotype of the type species of *Libycosaurus* is lost and cannot be distinguished from the three valid species based on available information, but does belong to the current concept of that genus. Thus they leave the type species as a nomen dubium but also have three valid species in the genus. This is what should be done with *Diplodocus* – retain the type *D. longus* as possibly indeterminate, and use *D. carnegii* and *D. hallorum* as diagnostic species.

## References

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